ENGINEERING DEPARTMENT

Jack Perreault, P.E., Town Engineer

The Engineering Department provides technical support to Town Boards, Commissions, and Departments. During the year 2005, support services were provided to the Planning Board, Conservation Commission, Sewer and Water Department, Highway Department, Public Buildings Department, Building Inspector, Health Department, Master Plan Implementation Committee, Police Department, Assessors, School Building Committee, Shrewsbury Development Corporation, School Department, and Fire Department. In addition, the Engineering Department provides survey, design, contract administration, and inspection services for Town-funded infrastructure improvement projects. We also provide construction inspection services for all projects approved by the Planning Board and Conservation Commission.

The Year 2005 was similar in many respects to 2004 for the Engineering Department. Development of residential projects was steady, although not as heavy as recent years. There were some small commercial projects that came to fruition, and others are in the planning stages. Long term planning and infrastructure studies put increased demands on staff time, and will continue for the upcoming year. These long term projects included implementation of the Master Plan recommendations, the Comprehensive Wastewater Management Plan, completion of the Town Center traffic improvements and enhancements, Route 9 design of traffic improvements and enhancements, Grafton Street design of traffic improvements, development of the GIS, the Townwide Stormwater Management Plan, construction of Centech Boulevard and the Route 20 intersection, the Assabet River Sediment Study, the Sewer Allocation Study, and

improvements to the sewer, water, drainage, and roadway infrastructure systems. Details of some of these projects are provided later in this report.

The Comprehensive Wastewater Management Plan (CWMP) is a study of the entire sewer system and treatment plant. This study is required by the Department of Environmental Protection (State) and the Environmental Protection Agency (Federal) as part of the permit for the treatment plant. The Town is conducting the study in conjunction with Westborough, Northborough, Marlborough, Hudson, and Maynard as part of the Assabet Consortium. All of the municipalities in the group have treatment plants that discharge into the Assabet River. Phase II of the study was completed in 2002. Much time was spent in 2005 negotiating the scope of work for Phases 3 and 4 with regulatory authorities. The scope of work will determine the direction of the study and the future of the expansion of the sewer system and the levels of treatment that will be required. Expansion of the treatment facility above its existing design capacity will not be an option in the future. Since the future capacity will be limited, funds were appropriated to perform a sewer allocation study. The purpose of the study was to establish limits for future flows and establish a sewer service district. The sewer allocation study was coordinated with the Town of Westborough and the Treatment Plant Board. Recommendations were brought to the Annual Town Meeting in 2005.

As part of the CWMP, and as a member of the Assabet Consortium, the Town has agreed to participate in a study of the sediment in the Assabet River. This study was recommended as a result of the preliminary findings of the Total Maximum Daily Load (TMDL) study performed by the State on the Assabet River. The treatment plants of the Assabet Consortium communities discharge treated effluent into the Assabet River. The effluent contains some levels of phosphorus. The TMDL has shown that even if all the phosphorus is removed from the effluent,

there is a significant amount of phosphorus in the sediment. Phosphorus promotes aquatic weed growth. The sediment study is being performed by the Army Corps of Engineers and will investigate methods to remove the phosphorus from the sediment. Funding for this study is being provided from State and Federal sources. It is anticipated that the study will be completed in 2007.

In a related matter, the new Discharge Permit was issued to the Westborough Treatment Plant by the EPA. This plant treats sewage from Shrewsbury, Westborough, and a portion of Hopkinton. The permit was appealed by both the Westborough Treatment Plant Board and by the Organization for the Assabet River (OAR). After a thorough review by the Board and its consultants and legal advisors, a meeting was held with EPA and DEP. Several concerns were addressed and the parties were able to come to an agreement and the appeals were dropped by both sides. The new permit will start in January 2006 and will include a 54-month schedule to design and construct improvements to the plant. At this time it is anticipated that the design and construction will cost between eleven and fifteen million dollars. Sewer rates will be impacted to cover the cost of the improvements.

This year the Master Plan Implementation Group (MPIG) put forth a major effort to bring forward zoning articles to both the Annual Town Meeting in May and the Special Town Meeting in October. Credit for development of these articles, informational packets, and eventual passage of all proposed changes goes largely to Eric Denoncourt (Town Planner) and Judi Barrett (Consultant). They worked tirelessly to provide information to the MPIG, Planning Board, Board of Selectmen, Town Meeting Members, effected property owners, and the general public. The changes included amendments to the Lakeway Overlay District, Senior Housing Requirements, Building Separation Requirements, and the Aquifer Protection Overlay District.

New sections approved included the Edgemere Overlay District, the Route 20 Overlay District, and the Inclusionary Housing.

This year there were multiple ongoing roadway improvement projects in various stages from design to completion of construction. The Town Center construction was completed in the Fall. The project met expectations for both congestion mitigation and aesthetic improvements. The project was truly a cooperative effort with Mass. Highway and the Town. That same cooperation was exemplified in the reconstruction of Route 9 at North and South Quinsigamond Avenues. Through the cooperation of Mass. Highway and J.H. Lynch and Sons, Inc., the Town was allowed to add enhancements and water system improvements to the project after it was bid. The majority of the improvements were completed in one construction season and traffic disruption was kept to reasonable levels considering the heavy volume of traffic on Route 9. The enhancements included ornamental street lights and traffic signals, imprint system crosswalks, a Lakeway Business District Entrance sign, and stamped concrete islands. These enhancements along with wider sidewalks and plantings were carried forward into the design of another project for the remainder of the Lakeway District from Dewey Road to Maple Avenue. The 25% design plans and right-of-way plans were submitted to Mass. Highway for review. It is anticipated that the project will be bid in 2006 with construction starting in 2007. On a similar note, the 25% design plans and right-of-way plans for Grafton Street were submitted to Mass. Highway and a public hearing was held with the abutters to the project. This project is scheduled to be bid in 2007 with work beginning in 2007 or 2008. For both Route 9 and Grafton Street, the Town is responsible for design costs and right-of-way acquisition while Mass. Highway will provide the construction funding. Using this process to reconstruct major roads allows the Town leverage for significant construction dollars while contributing about 10% of the total project cost. In

addition, the Town was able to secure all of the funding needed for the enhancements being proposed on Route 9. The funding sources include a Federal Enhancement Grant, a Turnpike Authority Grant, a grant from the Light Department, and a State budget line item appropriation that was secured through the efforts of Representative Karyn Polito. Finally, the construction of Centech Boulevard from Route 20 to Pine Street in Grafton was largely completed with the exception of the intersection at Route 20. The location and depth of a 12-inch high pressure gas main that supplies the City of Worcester required a redesign of the intersection to move the improvements further to the North. It is expected that the work for the revised design will be started in the Spring of 2006 with completion during the summer months. This project is being completed in cooperation with the Worcester Business Development Corporation and is being done entirely with funding grants.

Improvements were also made to the water system in 2005. The Engineering Department developed a contract for replacement of the water main in a portion of Spruce Street at Crescent Street, and the water main crossing Route 9 at Lake Street. Both projects went relatively well and were completed in the Fall. Both of the mains have been problematic for the Water Department in the last year. The Engineering Department also worked with the Water Department and DEP to resolve issues with the permits for water withdrawal as part of the Water Management Act and with the Water Conservation Program.

Also included in the Construction Contract developed by the Engineering Department was a significant amount of drainage work. As part of the contract, the culvert on Grafton Street near Old Brook Road was repaired. The repair was designed to stop erosion until the pipe can be replaced as part of the road reconstruction of Grafton Street in two years. The existing culvert in Reservoir Street at Straw Hollow Brook was also repaired by slip lining it with a new corrugated

pipe and by pumping grout between the outside of the new pipe and inside of the old concrete box culvert. New headwalls and guardrails were installed as part of the project. The replacement of the culvert on Holden Street was also included in the contract and this part of the work will be completed in 2006. Other drainage work completed in 2005 included the installation of an additional culvert at the Hills Farm Estates playground. The purpose of the culvert is to reduce flooding in the area adjacent to the playground. The Floral Street School Recharge Project, which was explained in last year's annual report, was completed with the funding from a grant from Intel Corporation. I would like to extend my gratitude to Intel for their interest and support of local environmental issues.

Recharge of the groundwater was also a common theme with both the Conservation Commission and Planning Board. Wherever soil conditions allow it, applicants are required to provide as much groundwater recharge as possible. This policy helps reduce stormwater runoff and increase the groundwater supply. Applicants are also required to provide calculations of the amount of recharge provided. The total of all recharge provided for all projects is then calculated by the Engineering Department to track the progress made in this area. This information is also used for the calculation of the water offset requirement of the Water Management Act. A significant amount of time is spent educating developers and their engineers and contractors about these requirements which are tied in to several state regulations and policies.

Progress was also made on the development of the Geographic Information System (GIS). GIS is part of the Engineering Department and the GIS Coordinator is a member of the Engineering Staff. During the year a significant amount of time was spent incorporating existing plans and information into the data base for GIS. Also, a contract was developed and awarded to

CDM to develop a web-based GIS that was made available to Department Heads for a trial run and will be put on the Town's website early in 2006 for use by the general public. The system allows the user to view maps and aerial photos of the entire town with zoom capabilities to get various scales of maps. In addition, the user can search the data by owner, street, parcel, or address. Abutters lists are easily developed for pubic hearing notices. The maps also contain multiple layers that can be turned on or off to provide the specific information that the user wants. Development of additional layers for the various utilities will continue in the upcoming year.

The Sewer Allocation Study was also completed in 2005. The purpose of the study was to review the sewer needs of the Town and compare it to the available capacity at the Westborough Treatment Plant. The Plant capacity is capped at 7.68 million gallons per day. As a result of the finite capacity, some residential areas of Town will utilize septic systems instead of being serviced by sewers. This would also be consistent with the State policy to provide sewers only where necessary. The Sewer Commission will be developing a Town-wide policy for the allocation of sewer capacity based on the recommendations of the study.

The Engineering Department also participated in some additional sewer projects including the design of the Hill Street Pumping Station improvements, Eaglehead Cove Pumping Station replacement, improvements to the Cherry Street Pumping Station, and continuation of the infiltration/inflow project.

This past year the Engineering Department has been working with the Highway Department to fulfill the requirements of the permit for the National Pollution Discharge Elimination System (HPDES) Stormwater General Permit Notice of Intent for Small Municipal Separate Storm Sewer Systems. The permit is required by the Federal Government through the

Environmental Protection Agency (EPA). The permit requires the Town to develop a five-year plan to manage stormwater to meet criteria in seven different areas. Those criteria are Public Education, Public Participation, Illicit Discharge Detection and Elimination, Construction Site Runoff Control, Post Construction Runoff Control, Municipal Good Housekeeping, and Best Management Practices for meeting the requirements of the Total Maximum Daily Load study. The Engineering Department prepared the plan that was submitted and accepted by DEP and EPA. The new requirements of this program will place significant demands on the Engineering Department to meet the annual reporting requirements and the oversight of the design, construction and maintenance of both private and public stormwater management systems. The Highway Department will also be impacted significantly as they maintain all existing public drainage facilities.

The Engineering Department reviews all plans for all projects submitted to the Conservation Commission and Planning Board. Staff members also attend all meetings and perform inspections for all work approved by these Boards.

The Department inspects the construction within all subdivisions to assure proper construction and adherence to approved plans and the Planning Board's Subdivision Rules and Regulations. During the past year, developers were active in approximately 27 of the uncompleted and approved subdivisions.

When a subdivision is completed, the roads and associated utilities are turned over to the Town for acceptance as public ways. The Engineering Department reviews the as-built drawings, layout and acceptance plans, and legal descriptions for all streets. Hearings are held with the Board of Selectmen and a presentation is made to the Town Meeting. This past year 13 streets were accepted as public ways.

Our normal work load involves the maintenance of the Town tax maps, computation of betterment liens and assessments including all necessary plans for filing at the Registry of Deeds; all necessary research, computation, plans and deed description for all easements and land acquisitions, and dispositions by the Town; reproduction of existing street layouts; preparation of contract documents and supervision of construction for street, sewer, water, and other public work projects; and feasibility studies for proposed projects by the various town departments.

SANITARY SEWER CONSTRUCTION

No new contracts went out for bid this year

SUBDIVISIONS (BY DEVELOPERS)

LOCATION	SIZE/TYPE INCHES	LENGTH FEET	6-INCH PVC HOUSE SERVICES
ADAMS FARM			
Adams Farm Road	8" PVC	1440	to all lots
Hamilton Circle	8" PVC	445	to all lots
Independence lane	8" PVC	1115	to all lots
Revere Circle	8" PVC	290	to all lots
Ease.(Adams to Independence)	8" PVC	480	-
Ease.(Hamilton to Adams Ease)	8" PVC	175	-
	8" DI	400	-
Ease.(Adams to Cherry)	8" PVC	690	-
	8" DI	655	-
Brook Street	2" FM	450	-
	6" FM	450	-
Cherry Street	8" DI	220	-
Ease.(Cherry to pump station)	8" DI	250	-
Gulf Street	8" PVC	615	to all lots
	4" PVC FM	575	-
Hartford Pike (Rte. 20)	8" PVC	235	-

HICKORY HILL ESTATES			
Grafton Street	8" PVC	490	to all houses
Hickory Drive (p/o)	8" PVC	545	to all houses
HIGHLAND HILL			
Meadow Hill Road	8" PVC	1280	to all lots
Ease.(Meadow Hill to High)	8" PVC	430	to all lots
MINNA TERRACE			
Afra Drive	8" PVC	440	to all lots
Sajda Drive	8" PVC	1,690	to all lots
Tasa Drive	8" PVC	470	to all lots
SUMMIT RIDGE ESTATES			
Hampshire Drive (p/o)	8" PVC	560	to all lots
Slocum Meadow Lane	8" PVC	1,795	to all lots
	4" PVC FM	1850	-
Trinity Circle	8" PVC	200	to all lots
Walnut Street	8" PVC	860	to all houses
Wheelock Street	4" PVC FM	500	-

TOTAL SEWER PIPE

8" PVC	14,245
8" DI	1,525
6" PVC FM	450
4" PVC FM	2,925
2" PVC FM	450

WATER MAIN CONSTRUCTION

A new contract was awarded to Five Oaks Construction Co., Inc., 152 Broadmeadow Road, Groton, MA 01450, on October 13, 2005 for Proposed Replacement of Holden Street Culvert, Rehabilitation of Grafton St. and Reservoir St. Culverts, Water Main Construction in Spruce St., Crescent St., Shady Lane Ave., Meadow Lane, Lake St. & Rte 9 Intersection - Dated August 2005

LOCATION	SIZE/TYPE INCHES	LENGTH FEET	NO. OF HYDRANTS
Crescent Street	8" PVC	*65	*1
Meadow Lane	8" PVC	*40	-
Rte 9 & Lake St intersection	8" DI	130	-
Shady Lane Avenue	8" PVC	*30	-
Spruce Street	8" PVC	*535	-

Work completed on contract awarded to J. A. Polito & Sons, Inc., 587C Hartford Tnpk., Shrewsbury, MA 01545, on August 5, 2004 for Drain Construction at Floral St. Elementary School & in Shirley Rd., Holden St. & Cherry St.- Water Main Construction in Shirley Rd., Holden St., Oak St., Lakewood Dr. & Boylston St.

The following water main work was completed:

LOCATION	SIZE/TYPE INCHES	LENGTH FEET	NO. OF HYDRANTS
Edgewood Avenue	8" PVC	*110	-
Lakewood Drive	8" PVC	*300	-
Oak Street	12" PVC	*1710	2 (1 and *1)
Shirley Road	8" PVC	*935	1

The drainage work was also completed.

TOTALS UNDER TOWN CONTRACTS

12" PVC	*1710	
8" PVC	*2015	
8" DI	130	
NO. OF HYDRANTS		4 (2 and *2)

*INDICATES REHABILITATION

SUBDIVISIONS BY DEVELOPERS

LOCATION	SIZE/TYPE INCHES	LENGTH FEET	NO. OF HYDRANTS
ADAMS FARM			
Adams Farm Road	8" PVC	2,130	4
Hamilton Circle	8" PVC	380	1
Independence Lane	8" PVC	1,380	3
Revere Circle	8" PVC	285	1
Boston Turnpike (Rte 9)	12" DI	940	1
COSMOPOLITAN ESTATES			
Clark Way	6" PVC	130	1
Gulf Street	12" PVC	*420	*1
HIGHLAND HILL			
Meadow Hill Road	8" PVC	1,600	3
Memorial Drive	8" PVC	530	-

MINNA TERRACE			
Afra Drive	8" PVC	445	1
Sajda Drive	8" PVC	2,660	4
Tasa Drive	8" PVC	485	1
SUMMIT RIDGE ESTATES			
Hampshire Drive (p/o)	8" PVC	375	1
Slocum Meadow Lane	8" PVC	1,765	3
	2" PVC	80	-
Trinity Circle	8" PVC	240	1
Walnut Street	8" PVC	470	1

TOTAL WATER PIPE UNDER SUBDIVISIONS

12" PVC	*420	
12" DI	940	
8" PVC	12,745	
6" PVC	130	
2" PVC	80	
NO. OF HYDRANTS		27 (26 and *1)

MISCELLANEOUS PROJECTS

I. Offsite Drainage Improvements in Phase I of Summit Ridge Estates Subdivision on Gulf Street between Slocum Meadow Lane and Wheelock Street:
10 new catch basins
4 new drain manholes
715-feet of new 15"
RCP
265-feet of new 12"
RCP

II. Offsite Drainage Improvements of Grand View Subdivision on Niblick Road:
490-feet of 12" RCP removed and replaced with 21" RCP

III. Offsite Drainage Improvements of Adams Farm on Memorial Drive (Rte 140)
125-feet of 24" RCP
40-feet of 12" RCP

IV. Drainage work completed by J.A. Polito working under the August 2004 Contract:
Floral Street School: 50-feet of 15" HDPE PERF
230-feet of 12" HDPE PERF
110-feet of 8" HDPE PERF
This was for the new groundwater discharge system

Holden Street: 20-feet of 12" RCP
Shirley Road: 595-feet of 12" RCP
Cherry Street: 835-feet of 12" RCP

V. Drainage work completed by Five Oaks Const. working under the October 2005 contract:
Grafton Street: box culvert rehabilitation was done to inside bottom of deteriorated sides
Reservoir Street: box culvert rehabilitation was done with a new pipe insert installed

VI. Developer of Summit Ridge Estates (David Parmenter) increased size of wet well at the Hill Street Sewer Pumping Station, further improvements to station to be done as well.

VII. Intersection of Rte 9 with North & South Quinsigamond Ave lights and safety improvements completed, including Rte 9 from Worcester Line to Dewey Rd.

VIII. Walgreens pharmacy opened on Rte 9 at Harrington Avenue Intersection

IX. Surveying at center of Town for proposed expansion to existing Fire Headquarters and moving of existing Cemetery Building and Library Proposed future expansion

X. Surveying for a new sewer pumping station on North Quinsigamond Avenue opposite the existing sewer pumping station at Eaglehead Cove Condominiums driveway

XI. Grafton Street right of way acquisitions being prepared for future reconstruction of Rte. 140 from center of Town to Rte. 9

COMMENTS

The work continued in several subdivisions (Arbor Village, Boston Hill Estates, Center Heights, Colonial Farms II & III, Cosmopolitan Estates, Dorothea Estates,Federal Estates, Grand View, Hickory Hills,Hickory Hill Estates,Highland Hill,Noble Oak Estates,Park Grove Farm, Prospect Hill, Rawson Hill Estates III, Saxon Woods "76"',Saxon Woods "76-8", Saxon Woods "98",Shannon's Woods, Southwoods,Stonemeadow Farm, Stonybrook Farm II, Summit Ridge, Trillium Wood, Wheelock Estates); development reviews and construction supervision, along with our day-to-day over the counter business, work performed for the other Town Departments, as well as the previously mentioned work, kept the department very busy throughout the year.

Of the approximately 26 active subdivisions that remain to be completed, the following 13 subdivisions have applied to have the streets accepted as public ways at the Annual Town Meeting in May 2006 totaling 18,405-feet or 3.49 miles and effecting approximately 215 lots:

I. Arbor Village
1 Arbor Drive
II. Boston Hill Estates
2 Boston Hill Circle
III. Dorothea Estates
3 Beths Road (p/o)
4 Sheryl Drive
IV. Noble Oak Estates
5 Adams Road (p/o)
6 Cox Lane
7 Jane Street

V.	**Prospect Hill**
	Adams Road (p/o)
	Beths Road (p/o)
VI.	**Saxon Woods "76"**
8	Carriage Hill Road (p/o)
VII.	**Saxon Woods "98"**
9	Birch Lane (p/o)
	Carriage Hill Road (p/o)
VIII.	**Shannon's Woods**
10	Darren Drive
11	Grace Avenue (p/o)
12	Shannon Drive
IX.	**Southwoods**
13	Lahinch Lane
14	Tralee Lane
15	Waterville Lane
X.	**Stonemeadow Farm**
16	Stonemeadow Farm Drive
XI.	**Stonybrook Farms II**
17	Argila Lane
18	Stonybrook Lane (p/o)
XII.	**Trillium Wood**
19	Turtle Creek Circle
XIII.	**Wheelock Estates**
20	Grist Mill Circle

In addition to these 20 streets, the following 6 open space parcels will be deeded to the Town totaling approximately 20.4887 acres:

I.	**Noble Oak Estates**	
1	Parcel A	4.3862 acres
II.	**Prospect Hill**	
	Parcel	4.374
2	H	acres
III.	**Shannon's Woods**	
3	Open Space Parcel	0.88 acres
IV.	**Southwoods**	
4	Parcel B	1.5025 acres
	Parcel	
5	C	7.3 acres
V.	**Stonybrook Farms II**	
		2.046
6	Open Space Parcel	acres

As always, I would like to thank the Staff in the Engineering Department for their continued hard work and dedication throughout the year. Budget pressures in recent years have caused a reduction in staff levels in the department. However, everyone has pitched in to do more with less while providing excellent service to other town departments and to the general public. I would also like to thank all my co-workers in other departments for their cooperation and teamwork that helped us all achieve our common goals. The members of the various boards and commissions should also be commended for giving so freely of their time. They serve because of their interest in the town and because they want to give back to the community, and I applaud them for that. Finally, I am very appreciative of the outstanding support that this department received on several projects from State Representative Karyn Polito. She continues to work tirelessly to help the town anyway she can and she always produces results. Many of our projects would not have been successful without her support.